

Environmental Protection Agency

Pt. 60, App. A-7, Meth. 25

P_t = Gas sample tank pressure after sampling, but before pressurizing, mm Hg absolute.
 P_{tr} = Final gas sample tank pressure after pressurizing, mm Hg absolute.
 q = Total number of analyzer injections of intermediate collection vessel during analysis (where k = injection number, $1 * * q$).
 r = Total number of analyzer injections of sample tank during analysis (where j = injection number, $1 * * r$).
 ρ = Density of liquid injected, g/cc.
 T_f = Final temperature of intermediate collection vessel, °K.
 T_{ti} = Sample tank temperature before sampling, °K.
 T_t = Sample tank temperature at completion of sampling, °K.
 T_{tr} = Sample tank temperature after pressurizing, °K.
 V = Sample tank volume, m³.
 V_t = Sample train volume, cc.
 V_v = Intermediate collection vessel volume, m³.
 V_s = Gas volume sampled, dsm³.
 x_i = Individual measurements.
 \bar{x} = Mean value.
 ΔP = Allowable pressure change, cm Hg.

Θ = Leak-check period, min.

12.2 Allowable Pressure Change. For the pretest leak-check, calculate the allowable pressure change using Equation 25-1:

$$\Delta P = 0.01 \frac{FP_b \Theta}{V_t} \quad \text{Eq. 25-1}$$

12.3 Sample Volume. For each test run, calculate the gas volume sampled using Equation 25-2:

$$V_s = 0.3857 V \left(\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}} \right) \quad \text{Eq. 25-2}$$

12.4 Noncondensable Organics. For each sample tank, determine the concentration of nonmethane organics (ppm C) using Equation 25-3:

$$C_t = \left(\frac{\frac{P_{tr}}{T_{tr}}}{\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}}} \right) \left(\frac{1}{r} \sum_{j=1}^r C_{tmj} \right) \quad \text{Eq. 25-3}$$

12.5 Condensible Organics. For each condensate trap determine the concentration of organics (ppm C) using Equation 25-4:

$$C_c = 0.3857 \frac{V_v P_f}{V_s T_f} \left(\frac{1}{q} \sum_{k=1}^q C_{cmk} \right) \quad \text{Eq. 25-4}$$

12.6 TGNMO Mass Concentration. Determine the TGNMO mass concentration as carbon for each test run, using Equation 25-5:

$$M_c = 0.4993 (C_t + C_c) \quad \text{Eq. 25-5}$$

12.7 Percent Recovery. Calculate the percent recovery for the liquid injections to the condensate recovery and conditioning system using Equation 25-6:

$$\text{Percent Recovery} = K \frac{M V_v P_t C_{cm}}{L P T_f N} \quad \text{Eq. 25-6}$$

where $K = 1.604 (^\circ\text{K})(\text{g-mole})(\%)/(\text{mm Hg})(\text{ml})(\text{m}^3)(\text{ppm})$.

12.8 Relative Standard Deviation. Use Equation 25-7 to calculate the relative standard deviation (RSD) of percent recovery and analyzer linearity.

$$\text{RSD} = \frac{100}{\bar{x}} \left[\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1} \right]^{\frac{1}{2}} \quad \text{Eq. 25-7}$$

13.0 Method Performance

13.1 Range. The minimum detectable limit of the method has been determined to be 50 parts per million by volume (ppm). No upper limit has been established.

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 References

1. Salo, A.E., S. Witz, and R.D. MacPhee. Determination of Solvent Vapor Concentrations by Total Combustion Analysis: A Comparison of Infrared with Flame Ionization Detectors. Paper No. 75-33.2. (Presented at the 68th Annual Meeting of the Air Pollution Control Association. Boston, MA. June 15-20, 1975.) 14 p.
2. Salo, A.E., W.L. Oaks, and R.D. MacPhee. Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control. Paper No. 74-190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association. Denver, CO. June 9-13, 1974.) 25 p.

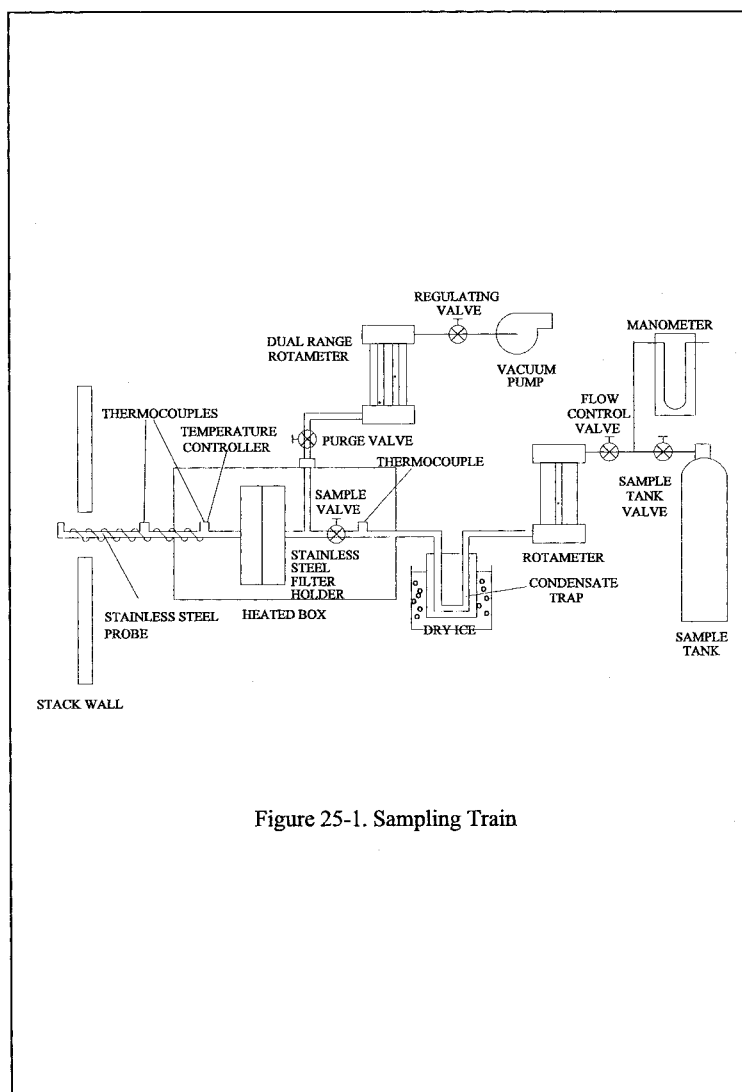
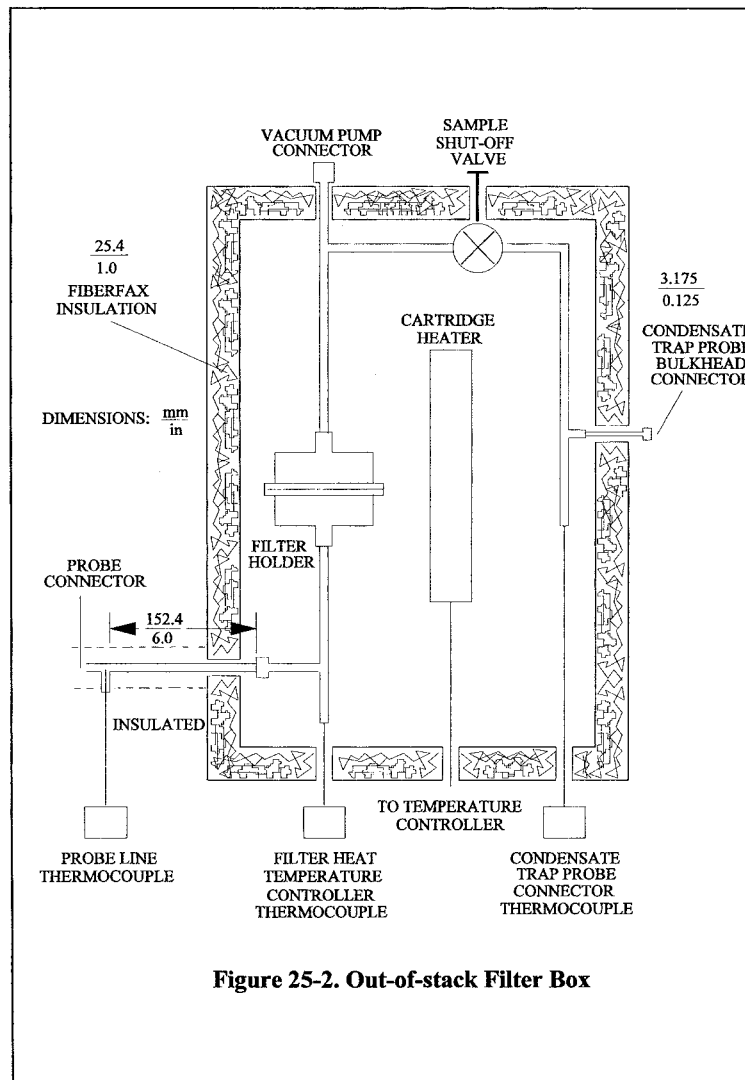


Figure 25-1. Sampling Train



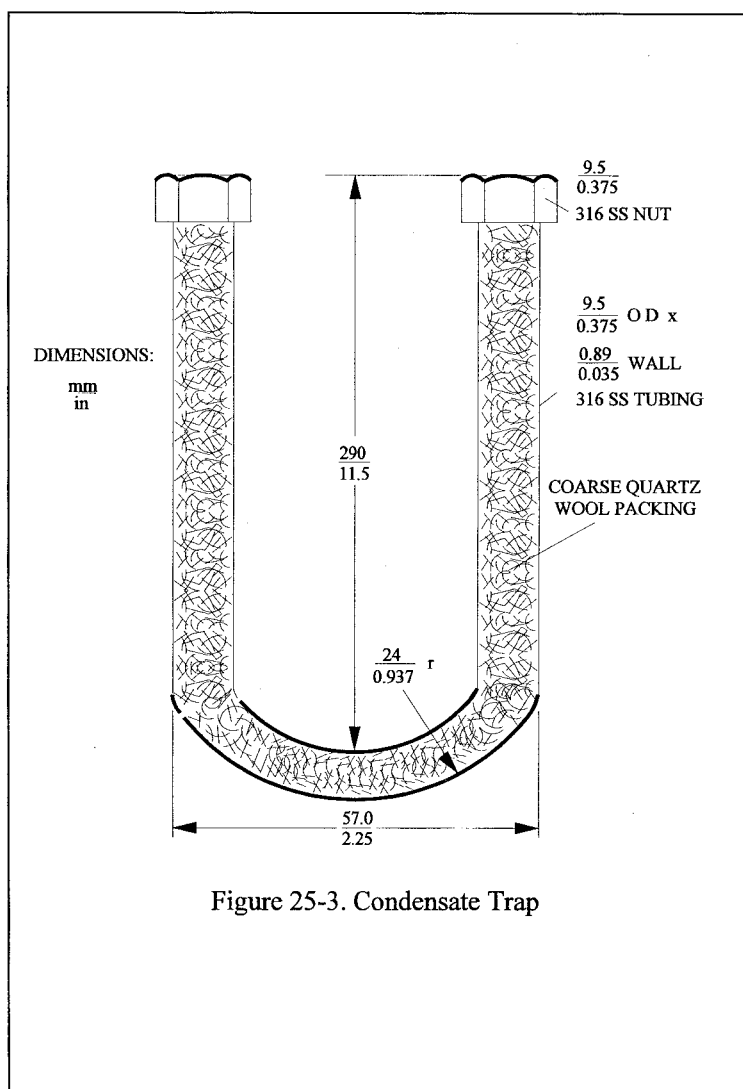


Figure 25-3. Condensate Trap